

Additions and Corrections

Bridging versus Hydride Shift in Gaseous Cations: Hydroxy as a Vicinal Substituent [*J. Am. Chem. Soc.* **1997**, 119, 8342–8349]. VIET NGUYEN, JACQUELINE S. BENNETT, AND THOMAS HELLMAN MORTON*

Page 8348: The left-hand side of eq 7 should read T_{He} .

JA9754259

S0002-7863(97)05425-5

Book Reviews *

Aqueous Biphasic Separations: Biomolecules to Metal Ions. Edited by Robin D. Rogers (Northern Illinois University) and Mark A. Eiteman (University of Georgia). Plenum: New York. 1995. viii + 191 pp. \$79.50. ISBN 0-306-45019-4.

This book, another in the useful series of volumes produced from the transactions of ACS symposia, contains the manuscripts of papers presented at an ACS symposium in March 1994 which brought national and international experts from two diverse groups, those interested in biochemical and metal separations, to highlight recent advances in the field and discuss their applications to real world problems in biological and metal ion separations. This reviewer recalls the benefit from combining diverse groups in such a manner. A Gordon Conference on Separations in the late 1980s served to introduce him to “centrifugal partition chromatography” (CPC), which earlier had been developed for and used by biotechnologists. Since then, CPC separations have been applied to many metals separations.

Aqueous two-phase systems have been used for the partitioning of cellular particles, biological macromolecules, and smaller organic molecules since the pioneering work of Albertsson. The first experiments on partition of cells and cell particles (bacteria, algae, chloroplast fragments, cell walls, and starch grains) in aqueous polymer (polyethylene glycol) phase systems were carried out in 1955 and published in 1956. In the last several years, a new group of international scientists has shown such systems also have remarkable utility for the separation of metal ions. Aqueous biphasic separation systems have high potential for cleaner, cheaper, and safer separations of metal ions as well as for gentle non-denaturing separations of molecules of biological interest.

This book draws on the expertise gathered for the symposium and presents the now fairly diverse work united by the use of aqueous biphasic systems. Chapters include material on metal ion separations, mass transfer effects, affinity partitioning, protein partitioning and refolding, and cell partitioning. It offers an excellent introduction to this interesting and still evolving separation technique.

Henry Freiser, *University of Arizona*

JA965562Q

S0002-7863(96)05562-X

Stable Carbocation Chemistry. Edited by G. K. Surya Prakash (University of Southern California) and Paul v. R. Schleyer (University of Erlangen Nürnberg, Germany). Wiley: New York, 1996. xvi + 587 pp. \$79.95. ISBN 0-471-59462-8.

Carbocations are involved in petroleum cracking and refining, coal processing, cationic polymerizations, synthetically important substitution and addition reactions, and rearrangements, as well as in a variety of biosynthetic transformations. Tremendous progress in understanding these positively charged organic species and applying them for industrially important processes has come from studies of long-lived carbocations in superacidic solutions, the topic of this book. It developed from a Loker Hydrocarbon Research Institute Symposium on Carbocation Chemistry, held in January 1992 on the occasion of George A. Olah's 65th birthday, to honor his pioneering and wide-ranging achievements.

The 17 chapters, contributed by the world's foremost authorities in the field, give a representative status report on stable carbocation

research, including generation and characterization of carbocations, development and application of spectroscopic techniques, as well as synthetic transformations under stable-ion conditions.

J. D. Robert's foreword and G. A. Olah's introductory chapter present two main actors' personal views on the history of carbocation chemistry. Both include autobiographic elements and are spiced with anecdotes: a worthwhile and pleasant reading for anybody interested in the development of one of the most important concepts in organic chemistry.

In the following chapter, P. v. R. Schleyer and associates demonstrate that at present high-level ab initio MO calculations are the only general and systematic way to obtain detailed structural information on carbocations which, because of their electron-deficient character, have the most unusual structures among all organic compounds. The comparison of computed structures and spectral properties with experimental data highlights the “fruitful interplay” between theory and experiment as a new dimension in chemical research. T. S. Sorensen exactly followed these lines. He employed all available tools, experimental and theoretical, for characterizing the structurally unique μ -hydridobridged carbocations, the role of which in the protolytic cleavage of alkanes is also discussed (Chapter 3). Has stable carbocation research come to an end? Not at all, as demonstrated by G. K. Surya Prakash (Chapter 4), who discusses some recent highlights of his collaboration with G. A. Olah, including β -silyl-stabilized carbocations, the first long-lived cyclopropyl cation, and some highly intriguing carbocations.

It is the merit of H. U. Siehl that vinyl cations, which have been elusive as long-lived entities until the 1980s, nowadays represent a well-established class of carbocations: In Chapter 5, Siehl presents a comprehensive overview on their generation and properties. The interest in the structure and rearrangements of the 9-barbaralyl cation ($C_9H_9^+$), the carbocationic analogue of bullvalene, dates back to the late S. Winstein. In Chapter 6, P. Ahlberg describes the parent and substituted barbaralyl species. V. G. Shubin and G. I. Borodkin demonstrate that many contributions to stable carbocation chemistry have come from the Novosibirsk laboratory. Since most of their original work on carbocationic rearrangements and π -cyclizations in superacid solution has been published in Russian, this summary in English is of special value.

The second part of the book, oriented toward methodology, starts with a contribution by E. M. Arnett and R. A. Flowers on the employment of reaction calorimetry and cyclic voltammetry for elaborating interrelations between carbenium ions R^+ , carbon radicals R^\cdot , and carbanions R^- , three different oxidation states of trivalent carbon. The following two chapters discuss the use of NMR isotope effects for the elucidation of carbocation structures. While M. Saunders and associates describe their “Isotopic Perturbation Method” for differentiating rapidly equilibrating from symmetrically bridged carbocations, D. A. Forsythe discusses the origin of intrinsic isotope effects in carbocations.

Though NMR spectroscopy is usually the method of choice for structural investigations of long-lived carbocations, the different time-scale of IR spectroscopy sometimes provides additional information: In Chapter 11, D. E. Sunko describes his matrix isolation methods and several applications of IR spectroscopy. Another way to freeze out rapidly equilibrating carbocations is to cool them to temperatures as

*Unsigned book reviews are by the Book Review Editor.

low as 5 K and to take solid state NMR spectra using the cross-polarization magic-angle spinning (CPMAS) technique as described by P. C. Myhre and C. S. Yannoni. Chapter 13 by D. T. Clark, Surface and Interface Studies of Organic Ions, emphasizes the use of ESCA for structural elucidations.

The ability to investigate structures of various types of carbocations by X-ray diffraction has possibly been the major breakthrough in carbocation research in the last decade. T. Laube, the pioneer in this field, presents an overview which covers not only carbocations but also heterocations with carbon substituents.

While the role of carbocations as reactive intermediates in synthetically useful procedures is well established, it is less known that organic synthesis can directly profit from reactions in superacid solution. The last three chapters of this book are devoted to that topic. J. Sommer reports on superacid-catalyzed carbonylations of alkanes, which may be of industrial importance. K. Shudo and T. Ohwada report on electrophilic substitutions of benzene and state that most electrophiles that can react with benzene are dicationic. Even natural product chemistry can be performed in superacid solution, as demonstrated by J.-C. Jacquesy for a variety of selective and high-yielding transformations of terpenoid and steroid compounds.

Very often, book editions of conference reports are only of rather limited value because a broad coverage of the field is seldom achieved. This is not the case here: almost all important trends of stable carbocation chemistry in recent years have been considered, and since most of the experts summarized one to two decades of research in a field they have been leading, the delay in publishing this volume is not very disturbing, especially since several of the contributions have been updated. The classical Olah-Schleyer series *Carbonium Ions*, Vols. I–V, which was interrupted in 1976, has found an excellent continuation.

Considering the very reasonable price, purchase can be recommended not only to libraries but also to individuals interested in the chemistry of positively charged carbon.

Herbert Mayr, Ludwig-Maximilians-Universität München

JA9657840

S0002-7863(96)05784-8

Advanced Catalysts and Nanostructured Materials: Modern Synthetic Methods. Edited by William R. Moser (Worcester Polytechnic Institute). Academic Press: San Diego, CA, 1996. xxvi + 592 pp. \$85.00. ISBN 0-12-508460-9.

This book, consisting of 22 chapters authored by 21 international groups of investigators, is considered by its editor to provide the catalytic scientist with the most important and current information on key materials synthesis procedures for the preparation of "advanced" catalysts and nanostructured materials. These same techniques are often applicable to material fabrication in fields such as chemical sensors and electronic, ceramic, and superconductor materials. Each chapter reviews recent literature relating to the synthetic method described and provides a detailed description of the preparative technique(s) employed, including equipment used, range of materials synthesized, characterization and proof of structures, and in some cases catalytic data. Uniformity in chapter format accounts in part for the books readability and relative ease of access to information, as compared to many other multiple-authored compendiums.

The book title and usage by the chapter authors distinguishes between the terms "advanced catalysts" and "nanostructured materials" but leaves the term "advanced catalysts" undefined other than in a synopsis on the back cover. Here attention is directed toward the latest techniques for the preparation of solid-state materials of specific structure and morphology. Apparently materials prepared with specific structure and morphology are equated with advanced materials, with the term "nanostructured materials" applied to size considerations. Another ambiguously applied term is "mesoporous", as exemplified in separate chapters describing mesoporous molecular sieve systems and microporous metal-oxygen cluster compounds, respectively—both chapters dealing with materials of angstrom-range porosity.

The process of attempting to sort out these details of terminology led to a rather comprehensive reading of the text. I was intrigued and impressed by the range of synthetic and characterization methods described, as illustrated by the following list of chapter topics: 1. Designed synthesis of molecular sieves using surfactant-directing agents, J. C. Vartuli et al.; 2. Prehydrolysis in preparation of Zirconia-Silica

aerogels, J. B. Miller, E. I. Ko; 3. Chemistry of preparation of V-P mixed oxides, F. Cavani et al.; 4. Gel-supported precipitation: an advanced method for synthesis of pure mixed oxide spheres of zirconia/titania, G. Centi et al.; 5. Pt-catalyzed sulfur dioxide oxidation, T. R. Felthouse et al.; 6. Applications of supercritical drying in catalyst preparation, D. R. Milburn et al.; 7. Aerogel synthesis as an improved method for the preparation of Pt-promoted zirconia-sulfate catalysts, G. Strukul et al.; 8. Surfactant-stabilized nanosized colloidal metals and alloys as catalyst precursors, H. B'nnemann, W. Brijoux; 9. Sonochemical preparation of nanostructured catalysts, K. S. Suslick et al.; 10. Preparation and characterization of polymer-stabilized Rhodium particles, G. W. Busser et al.; 11. Gas-phase synthesis of nonstoichiometric nanocrystalline catalysts, J. Y. Ying, A. Tsch'ope; 12. A flow-through hydrothermal method for the synthesis of active nanocrystalline catalysts, D. W. Matson et al.; 13. The synthesis of nanostructured pure-phase catalysts by hydrodynamic cavitation, W. R. Moser et al.; 14. Nanocrystalline zeolites, M. C. Lovallo, M. Tsapatsis; 15. Preparation of pillared clays and their catalytic properties, A. Clearfield; 16. Microporous metal-oxygen cluster compounds (heteropolyoxometalates), J. L. Bonardet et al.; 17. Preparation of bulk and supported heteropolyacid salts, S. Soled et al.; 18. Preparation of iron/molybdenum/molecular sieves by chemical vapor deposition, J. S. Yoo et al.; 19. Chemical vapor deposition and decomposition: preparation of metal and metal oxide catalysts in a fluidized bed reactor, M. Baerns et al.; 20. Synthesis of catalytic materials by spray pyrolysis, A. Wold et al.; 21. Formation of nanostructured V₂O₅-based catalysts in flames, P. F. Miquel, J. L. Katz; 22. Preparation of advanced catalytic materials by aerosol processes, W. R. Moser et al.; 23. Use of an aerosol technique to prepare iron sulfide based catalysts for direct coal liquefaction, D. B. Dadyburjor et al.

The field encompassed is certainly of increasing practical and scientific interest, having greatly benefited by the remarkable advances in various characterization techniques, allowing adjustment of synthetic procedures and conditions leading to improved performance and catalyst uniformity. Especially impressive are the microscopic techniques enabling detailed angstrom range characterization of fine particle structure and morphology on an almost routine basis, as applied effectively by the chapter authors.

The book is practical in outlook, concentrating on methods rather than theory or mechanistic aspects, relying on references to supply information covering the detailed chemistry to the extent it is known for each of the synthetic methods described. I believe the book will be well received by those actively engaged in the field as well as those working in peripheral areas wishing to gain insights to methods employed. It will be a useful addition to many private and institutional scientific and engineering libraries.

Boris Levy, Boston University

JA9657925

S0002-7863(96)05792-7

Advances in Quantitative Structure-Property Relationships, Volume 1. Edited by Marvin Charton (Pratt Institute). JAI Press: Greenwich, CT, 1996. xi + 229 pp. \$109.50. ISBN 1-55938-549-9.

This volume on the quantitative structure-property relationship (QSPR) is edited by one of the pioneers in substituent constants, Marvin Charton, plus four groups of experts from the pharmaceutical industry and a university chemistry department.

The topics include the following: (1) Comparative Molecular Field Analysis: COMFA, by Martin, Kim, and Lin of Abbott Laboratories. In this chapter, the basis, advantages, and disadvantages of COMFA as compared to traditional QSAR are presented. Examples of applications of COMFA to biological systems and its potential use in 3-D searching and de novo design are discussed. (2) Electronic Structure Calculations in Quantitative Structure-Property Relationships, by Saunders and Livingstone. The authors discuss the use of quantum mechanical descriptors in describing electronic structures of molecules and their uses in QSPR. (3) Development and Uses of Scales of Solvent Nucleophilicity, by Kevill. The author discusses the solvent effects in solvolysis reactions and various scales and substrate systems used in deriving the solvent nucleophilicity, including the multiparameter approach. (4) Structure-Property Relationships in Drug Design: Model Finding and Verification Strategies, by Mager. In this chapter, a brief discussion on the linear free-energy relationship is followed by discussion of statistical analysis including regression analysis and related

topics like principal component analysis and partial least-squares and their inherent limitations. (5) The Estimation of Electrical Effect Substituent Constants for Correlation Analysis. Charton compares the monoparametric to the triparametric model for substituent electric effects. Three major conclusions regarding the nature of electric effects are presented as well as many specific equations.

This book should be of interest to graduate students, postdoctoral fellows, industrial chemists, and those teaching pharmaceutical, medicinal, and agrochemical topics to graduate students. The date of publication is 1996; however, the references cited do not include publications published after 1993. Nevertheless, this monograph still serves as a useful reference book on the subject matter.

Eric J. Lien, *University of Southern California*

JA975581F

S0002-7863(97)05581-9

Techniques in Protein Chemistry VIII. Edited by Daniel R. Marshak (Osiris Therapeutics, Inc.). Academic Press: San Diego, CA, 1997. xxi + 908 pp. ISBN 0-12-473557-6.

This book is the latest volume in the series describing the most up-to-date methodologies in proteins. The contributions were selected from presentations at the Tenth Symposium of the Protein Society held in San Jose, CA, in August 1996. The book is divided into the following sections: Primary Structural Analysis; Physical and Chemical Analysis; Chemical Modification; Posttranslational and Other Modifications; Interactions of Protein with Ligands; Protein-Protein Interactions; Macromolecular Assemblies; Three Dimensional Structure; Dynamics and Folding; and Biological and Chemical Design.

JA975629P

S0002-7863(97)05629-1

Synthetic Methods of Organometallic and Inorganic Chemistry, Volume 2. Edited by W. A. Hermann (Tech. Univ. Munchen), Norbert Auner (Humboldt-Univ. Berlin), and Uwe Klingebiel (Univ. Gottingen). G. Thieme: Stuttgart, Germany, 1996. x + 310 pp. DM185.00. ISBN 3-13-103031-3.

This is Volume 2 of a new series which is designed to provide a successor to the classic *Brauer's Handbook of Preparative Inorganic Chemistry*. The new series incorporates organometallic chemistry and is intended to present a more modern approach to synthesis. Eight volumes, in all, are planned, and they will cover much of the periodic table. The present volume covers groups 1, 2, 13, and 14. The first chapter covers the organic compounds of lithium and sodium (22 pages containing 36 syntheses), inorganic compounds of lithium and sodium (20 pages containing 28 syntheses), and compounds of the alkaline earth metals (16 pages 34 syntheses). The second chapter covers group 13, and most of the material is translated from Brauer's third edition (1978). Boron compounds (24 pages containing 34 preparations), aluminum compounds (15 pages containing 36 preparations), and Ga, In, and Tl compounds (44 pages containing 104 preparations) constitute this chapter. The balance of the volume, 155 pages, is devoted to organometallic compounds of Si, Ge, Sn, and Pb. The level of coverage differs quite markedly in the volume. Thus the treatment of groups 1, 2, and 13 appears to rely on quite old literature and methods, and this is a shortcoming. The literature cited tends to be 30–40 years old, and much of it derives from a translation of Brauer. On the other hand the treatment of group 14 is much more current and comprehensive. In addition to providing much more modern methods, the latter treatment provides extensive physical data on the compounds described, and in some cases, detailed structural data are given. The contrast in treatment is seen most vividly in the sections on group 13. The preparation of diborane(6) relies on methods developed between 1960 and 1968, whereas there are much more useful methods available today, some not requiring solvents and others providing much more simple laboratory scale preparations of pure material. Similar criticisms can be made for BMe_3 , $\text{B}_3\text{O}_3\text{Me}_3$, GaAs, InEt_3 , etc., among others. Thus in some instances, chemists would be better advised to seek methods described in *Inorganic Synthesis* (Wiley) or Volume 2 of *Organometallic Synthesis* (Academic Press). On the other hand the treatment of group 14 chemistry is really very good. Some of the syntheses are translations from Brauer, but many are contributions by guest authors and provide much detail. Thus, for those interested in group 14 chemistry, the volume is highly recommended.

The major strength of the volume is that it is written very well. It is quite comprehensive in scope and provides methods for a wide range of very useful starting materials. Although some content is dated and is translated from the earlier work, its availability in English in this new series will be a major advantage to many chemists. The methods described are varied and do not appear to reflect the bias of the authors. Thus the volume, and presumably the complete series, would be a major asset to any academic or industrial chemistry library, although the cost may preclude individuals from adding it to their personal collections.

Lawrence Barton, *University of Missouri—St. Louis*

JA965722Y

S0002-7863(96)05722-8

Solid-Liquid Electrochemical Interfaces. Edited by Gregory Jerkiewicz (Universite de Sherbrooke), Manuel P. Soriaga (Texas A&M University), Kohei Uosaki (Hokkaido University), and Andrzej Wieckowski (University of Illinois at Urbana-Champaign). American Chemical Society: Washington, DC, 1996. xii + 354 pp. \$110.95. ISBN 0-84123480-9.

ACS Symposium Series 656. Developed from a symposium sponsored by the International Chemical Congress of Pacific Basin Societies at the 1995 International Chemical Congress of Pacific Basin Societies. This title presents diverse applications of low-energy electron diffraction (LEED), Auger electron spectroscopy (AES), and X-ray photoelectron spectroscopy (XPS) to the study of the solid-liquid interface. It applies scanning tunneling microscopy (STM) and atomic force microscopy (AFM) to in situ studies of structures of substrates and adsorbates during electrochemical measurements. It then presents a theoretical approach to modeling of the electrochemical interface. There are 23 chapters. Indexes include author, affiliation, and subject.

JA975609N

S0002-7863(97)05609-6

Preparative Carbohydrate Chemistry. Edited by Stephen Hanessian (University of Montreal). Marcel Dekker: New York, 1997. xiii + 648 pp. ISBN 0-8247-9802-3.

If demand and use by an enthusiastic group of students and postdocs is any measure of quality, then Hanessian's *Preparative Carbohydrate Chemistry* is top notch! I purchased a copy of this book earlier in the year, and it was immediately snarfed up by my research group, and I have hardly been able to lay my hands on it since. It enjoys a popularity in the lab perhaps matching or exceeding that generated by Green and Wuts' *Protective Groups in Organic Chemistry* or by Perrin and Armarego's *Purification of Laboratory Chemicals*, both of which glide around the lab from desk to desk, often causing mild disturbances when one or the other is temporarily misplaced by an errant worker. The book is without a doubt a very useful volume, a time saver, and a reliable guide to the laboratory practice of carbohydrate chemistry.

From the outset of reviewing the book, one discerns that the editor has chosen his topics carefully and has matched the topics with world leaders (a total of 45—including a number of the younger set) in the particular area. Each major part (Parts I–VII) has an introductory commentary by the editor, written in a lively style that captures the editor's enthusiasm for carbohydrate chemistry and provides the reader with insights into the field that often go unnoticed. The commentary is followed by a number of sections on particular facets of the area under discussion. Each section, for the most part, is meticulously divided into an Introduction, Methods, Experimental Procedures, and References, although the editor has refreshingly allowed some individual variation from section to section, a positive move in line with Emerson's view that "A foolish consistency is the hobgoblin of little minds..." (R. W. Emerson, *Essays*, "Self Reliance"). The book is thus set apart from a number of the stuffer productions that have typically characterized the field. The Introduction is generally devoted to historical developments, general reactivities, mechanisms, and the like, with emphasis on use of the particular chemistry under review. The Methods section then delves into various methods to accomplish the chemical reactions being considered, with full consideration being given to choice of method, salient aspects of mechanistic chemistry, etc. Finally an Experimental Procedures section gives the practitioner chosen examples of preparative procedures for the particular type of chemistry under consideration. Choices seem, in general, to cover most ranges of application, and attention is given to processes that can be executed in

the presence of sensitive functional groups, protective groups, and the like. While the critical reader might quibble with a choice made here and there, and might even have suggestions for a better example, the examples chosen, by and large, serve well to define the scope of the chemistry under consideration. The procedures are as detailed as those demanded by the finest of synthetic journals; hence, many a trip to the library can be avoided. One might caution the inexperienced lab worker that, for a particular example at hand, a search of the literature should still be made, lest a considerable amount of lab time be spent in adapting a procedure to a related compound. On the other hand, these procedures often represent the most up-to-date advances, and the chemist may well be able to improve on a "lit." procedure by adapting one of the preparations in the book to an older example. The possible ramifications of the procedures presented in this book are virtually endless.

Parts I–VII deal with topics ranging from I. Sugar Derivatives (covering acetals, dithioacetals, and selective O-substitution), to II. Selected Reactions in Carbohydrate Chemistry (mainly function group interconversions), to III. Chemical Synthesis of O- and N-Glycosyl compounds, and of Oligosaccharides (covering glycopeptide and oligosaccharide synthesis and glycosidation methods in general), to IV. Enzymatic Synthesis of Sialic Acids, Kdo, and related Deoxyulosonic Acids, and of Oligosaccharides (devoted to enzymatic procedures for sugar synthesis and glycosidation), to V. Synthesis of C-Glycosyl Compounds (covering free-radical methods and Lewis acid-promoted glycosylarene syntheses), to VI. Carbocycles from Carbohydrates (covering carba-sugars, inositols, and the like), to finally Part VII. Total Synthesis of Sugars from Nonsugars (which includes a chapter on amino sugar synthesis, as well as one on neutral sugars).

The volume is supported by a reasonably complete index (subject index, only), although the Table of Contents section may prove more useful, in general, for locating reactions of interest. The editor is to be complimented on his choice of topics and for his expert guidance that was certainly exercised in the assembly of the chapters. This book will serve well toward teaching the mysteries of carbohydrate chemistry to the practicing organic chemist, and Professor Hanessian is congratulated in taking yet another step toward breaking down the barriers of what was once an elusive, mysterious field and presenting synthetic aspects of it so well to the broader organic research community.

The book certainly belongs in every research library and on the bookshelf of every chemist who even thinks he/she might do some carbohydrate chemistry. For its content, the price of \$150 is not unreasonable. Envy me, for I am now adequately equipped with two copies!

David C. Baker, *The University of Tennessee*

JA9755166

S0002-7863(97)05516-9

Biological Macromolecular Dynamics. Edited by Stephen Cusack (European Molecular Biology Laboratory), Herma Buttner, Michel Ferrand, Paul Langan, and Peter Timmins (Institut Laue-Langevin). Adenine Press: Schenectady, 1997. ix + 474 pp. \$125.00. ISBN 0-940030-49-7.

This book developed from a workshop in Inelastic and Quasielastic Neutron Scattering in Biology, October 14 and 15, 1996, at the Institut Laue-Langevin in Grenoble, France. Investigations of dynamics in biological systems using inelastic and quasielastic neutron scattering have increased significantly over the last few years, and this volume looks at the progress in this field.

JA975624S

S0002-7863(97)05624-2

Static Headspace-Gas Chromatography Theory and Practice. By Bruno Kolb (Bodenseewerk Perkin-Elmer GmbH) and Leslie S. Ettre (Yale University). Wiley-VCH: New York, 1997. xx + 298 pp. \$79.95. ISBN 0-471-19238-4.

Headspace-gas chromatography (HS-GC) has been practiced for 40 years, and is an important analytical tool in the food industry, environmental analysis, and the analysis of polymers. Its widest application is in the analysis of blood alcohol levels, being the standard method for this measurement in many countries. HS-GC is widely

used to test for volatile organics in water, and is the basis of many regulatory test procedures.

As an established analytical procedure, the theory behind HS-GC has well been understood for years. Many practical applications of this technique have been published as well. Most new applications of HS-GC are in the environmental field, where the analysis of soil and water samples for volatile organics often generates the majority of the revenue in commercial analytical laboratories. This book does not break any new ground in analytical chemistry, but instead serves to bring together the recent developments of a mature technology. It has been 13 years since a comprehensive book on HS-GC has been published, and the current books on gas chromatography devote only a few pages to the topic. This book contains nine chapters, arranged in a logical progression from the background and theory of HS-GC to technique and special applications. The second chapter provides an easily understood discussion of the theory of headspace analysis, supported with illustrative examples. The authors emphasize practical applications throughout, and provide frequent tables of useful, sometimes difficult to locate information. The table on partition values for selected air-water systems at different temperatures (Table 2.2) and the listing of glass transition temperatures for selected polymers (Table 4.1) are two examples illustrating this point. The most valuable contribution this book makes is to provide a very large number of practical tips and little tricks that were learned in the authors' own laboratories. The discussion on vial size, septums, and caps alone would justify the purchase of this book for anyone doing HS-GC analysis. Recent developments in HS-GC are adequately referenced, but the majority of the citations are taken from older publications, chosen for their significance to the field.

Headspace-Gas Chromatography, Theory and Practice is a welcome addition to the chemical literature. It brings recent developments in HS-GC into one place, and also gives the theoretical understanding prerequisite to the practice of HS-GC.

Richard D. Foust, Jr., *Northern Arizona University*

JA975575J

S0002-7863(97)05575-3

Dielectric Spectroscopy of Polymeric Materials: Fundamentals and Applications. Edited by James P. Runt (Pennsylvania State University) and John J. Fitzgerald (General Electric Company). American Chemical Society: Washington, DC, 1997. xvi + 461 pp. \$124.95. ISBN 08412-3335-7.

ACS Professional Reference Book. This book provides a comprehensive discussion of the fundamental principles in dielectric spectroscopy. It examines in detail the methods used in data modeling and some specialty techniques such as high-frequency dielectric measurements and thermally stimulated currents. It discusses applications of dielectric spectroscopy in polymer solutions, polymer blends, polymeric liquid crystals, and other polymeric systems. Chapter headings include Fundamentals of Dielectric Materials, Modeling and Techniques, and Application of Dielectric Spectroscopy to Polymer Systems.

JA975608V

S0002-7863(97)05608-4

Phase-Transfer Catalysis Mechanisms and Syntheses. Edited by Marc E. Halpern (PTC Technology). American Chemical Society: Washington, DC, 1997. xii + 314 pp. \$99.95. ISBN 0-8412-3491-4.

ACS Symposium Series 659. Developed from a symposium sponsored by the International Chemical Congress of Pacific Basin Societies at the 1995 International Chemical Congress of Pacific Basin Societies. This title highlights diverse contributions from the foremost international experts in the field of phase-transfer catalysis. It presents the mechanism of phase-transfer catalysts and provides helpful guidelines for conducting research with phase-transfer catalysts and developing new phase-transfer catalysis applications. It discusses organic synthesis and polymer modification using phase-transfer catalysis, chiral phase-transfer catalysis, triphase catalysis, and new catalysts. Chapter headings include Mechanisms and Research Guidelines, Phase-Transfer Catalysis in Organic and Polymer Synthesis, and

Phase-Transfer Catalysts. The indexes include author, affiliation, and subject.

JA9756073

S0002-7863(97)05607-2

Phytochemicals for Pest Control. Edited by Paul A. Hedin (U.S. Department of Agriculture), Robert M. Hollingworth (Michigan State University), Edward P. Master (U.S. Department of Agriculture), Junshi Miyamoto (Sumitomo Chemical Co., Ltd.), and Dean G. Thompson (Canadian Forest Service). American Chemical Society: Washington, DC, 1997. x + 372 pp. \$109.95. ISBN 0-84123488-4.

ACS Symposium Series 658. Developed from a symposium sponsored by the ACS Division of Agrochemicals at the 1995 International Chemical Congress of Pacific Basin Societies. This title identifies and describes unique biologically active natural products that have applications for pest management such as insects, weeds, diseases, and fungi. It presents structure–activity studies of natural-product pest control agents and evaluates biologically active proteins and peptides affecting insects. It also covers identification of new plant natural products with unique biological activities. Chapter headings include Identification and Utilization of Biological Active Natural Products, Novel Natural Products with Applications for Pest Management, Structure–Activity Studies of Natural-Product Pest-Control Agents, and Biologically Active Proteins and Peptides Affecting Insects. Indexes include author, affiliation, and subject.

JA9756051

S0002-7863(97)05605-9

Immunochemical Technology for Environmental Applications.

Edited by Diana S. Aga and E. M. Thurman (U.S. Geological Survey). American Chemical Society: Washington, DC, 1997. xii + 396 pp. \$119.95. ISBN 0-8412-3487-6.

ACS Symposium Series 657. Developed from a symposium sponsored by the Division of Environmental Chemistry, Inc. The title presents the basic principles and practices of environmental immunoassays, including applications to soil and water analysis, the development and optimization of immunoassays for a variety of contaminants, and the use of statistical manipulations and neural networks to address cross reactivity in immunoassays. It highlights novel formats of immunoassays such as immunosensors, immunoaffinity techniques, multiresidue assays, immunofluorescent detection systems, and flow-injection techniques and then discusses the reliability of all these techniques. This book will be especially valuable for novices in immunochemical techniques. Chapter headings include Antibody Production and Assay Development, New Formats of Immunochemical Techniques, Immunoassays in Environmental Studies and Monitoring, and Sample Preparation, Chemometrics, and Quality Control. Indexes include author, affiliation, and subject.

JA975604Q

S0002-7863(97)05604-7

Physics and Chemistry of Low-Dimensional Inorganic Conductors.

Edited by Claire Schlenker (CNRS), Jean Dumas (CNRS), Martha Greenblatt (Rutgers, The State University of New Jersey), and Sander van Smaalen (University of Bayreuth). Plenum Press: New York, 1996. xi + 481 pp. \$125.00. ISBN 0306-45304-5.

This book is the result of the proceedings of a NATO Advanced Study Institute on Physics and Chemistry of Low-Dimensional Inorganic Conductors, held June 13–23, 1995, in Les Houches, France. This Advanced Study Institute is the continuation of a series of similar ones which have taken place every few years since 1974. The field of low-dimensional conductors has been very active for more than 20 years. It has grown continuously, and both the inorganic and organic materials have remarkable properties, such as charge and spin density waves and superconductivity. The discovery of superconductivity at high temperature in copper-based quasi-two-dimensional conducting oxides nearly 10 years ago has further enlarged the field and stimulated new research on inorganic conductors. The Institute was focused on the chemical aspects and the physical properties of families of transition

metal oxides, chalcogenides, and bronzes showing quasi-one-dimensional or two-dimensional electronic properties. The chapter headings are Materials and Chemistry; Introduction to Charge Density Waves, Spin Density Waves and Wigner Crystals; Structural Studies; Electronic Structures: Theory and Experiment; Thermal Properties and Excitations; and Dynamics of Charge and Spin Density Waves: Non Linear Transport, Dislocations and Plasticity. This volume is from the NATO Advanced Science Institutes Series, Series B: Physics, Volume 354.

JA975601D

S0002-7863(97)05601-1

Compilation of Reported ^{77}Se NMR Chemical Shifts. By Thomas M. Klapotke (University of Glasgow) and Matthias Broschag (Technische Universität Berlin). Wiley/VCH: New York, 1996. x + 134 pp. \$74.95. ISBN 0-471-96722-X.

There has recently been a growing level of interest in NMR studies using low abundance nuclei. In particular, the measurement and interpretation of ^{77}Se nuclear resonance chemical shifts is an area which has received increased attention in recent years, with large quantities of data having been reported in the scientific literature. In this book the authors have gathered and presented in an accessible and logical manner, the fullest and most comprehensive collection of ^{77}Se chemical shift data published to date, much of which has been recorded in the laboratories of the authors. A brief introduction to selenium NMR is given, followed by the main body of the work which tabulates the chemical shifts of selenium bonded to elements from group I down to group 17. The chemical shift data are presented with respect to a given reference standard, $(\text{CH}_3)_2\text{Se}$, and in addition to the original reference standard reported in the literature.

JA975600L

S0002-7863(97)05600-X

Liquid-Crystalline Polymer Systems: Technological Advances.

Edited by Avraam I. Isayev, Thien Kyu, and Stephen Z. D. Cheng (University of Akron). American Chemical Society: Washington, DC, 1996. xii + 418 pp. \$129.95. ISBN 0-8412-3408-6.

ACS Symposium Series 632. Developed from a symposium sponsored by the Division of Polymeric Materials: Science and Engineering, Inc., at the 209th National Meeting of the American Chemical Society, Anaheim, CA, April 2–7, 1995. This book provides a comprehensive report on the synthesis, structure, rheology, processing, performance, and applications of liquid-crystalline polymers (LCPs); discusses self-reinforced composites prepared through the melt processing of thermoplastics and thermotropic LCPs; addresses current research efforts in making polymer-dispersed liquid crystals; reports recent studies on the structure and phase behavior of mesophases; and describes the synthesis and properties of new main-chain and side-chain liquid-crystalline block copolymers, mesogen-jacketed LCPs, and liquid-crystalline thermosets. Chapter headings include Molecular Composites, Self-Reinforced Composites, Polymer-Dispersed Liquid Crystals, Structure of the Mesophase, and Synthesis and Properties. The indexes include author, affiliation, and subject.

JA975599Q

S0002-7863(97)05599-6

Dictionary of Plant Toxins.

Edited by Jeffrey Harborne (University of Reading, U.K.) and Herbert Baxter (Consultant, Ilford, Essex, U.K.). Associate Editor Gerard P. Moss (Queen Mary and Westfield College, London). Wiley: New York, 1996. xv + 523 pp. \$195.00. ISBN 0-471-95107-2.

The purpose of this dictionary is to list the plant toxins which are known or which are likely to have adverse effects on any and every form of animal life. This group of natural products is clearly and logically set out and includes information ranging from common name and chemical classification to chemical structures and details of natural occurrence. Each entry also includes essential biographical references. The indexes include subject, species, molecular formula, and common names.

JA975528R

S0002-7863(97)05528-5